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DHEC Health Advisory

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Infant Deaths due to Pertussis in South Carolina

Background

During the months of June and July 2005, two infant deaths in South Carolina due to pertussis were reported to SC DHEC. Information gathered from the investigation of these cases shows no apparent epidemiological link. Common themes in both cases were failure to recognize pertussis in parents of infants and failure to recognize pertussis in the infants. Underlying medical conditions were present in one case.

This advisory serves as a reminder that pertussis should be considered in the differential diagnosis of any infant who presents with typical or atypical symptoms of pertussis. A history of cough illness in a family member, caretaker or other close contact should always be obtained and should alert the physician of possible pertussis in the infant. Failure to do so may result in delayed diagnosis.

Epidemiological Information Regarding Pertussis

- Pertussis is one of the most contagious diseases known, with an attack rate of 90% of susceptible close contacts exposed to pertussis.
- Neither pertussis infection nor pertussis immunization provides prolonged immunity, leaving many persons susceptible to infection/reinfection.
- The incidence of pertussis has been increasing in the U.S. since the mid 1990's.
- Pertussis occurs in every age group and is now being seen more frequently in infants, adolescents and adults. In the pre-vaccine era, pertussis was seen more frequently in young children.
- Studies have shown that 13 to 32 percent of adolescents and adults with an illness involving cough of ≥ 6 days duration have pertussis (Hewlett, EL and Edwards, KM, Pertussis—Not Just for Kids. NEJM 2005 March;352 (12):1215-22).
- A recent CDC study of pertussis in infants showed that in 75% of infant cases of pertussis, a parent, sibling or grandparent with pertussis was the source of infection (Bisgard, KM, et al. Infant pertussis: who was the source? Pediatr Infect Dis J. 2004 Nov;23 (11):985-9).

Clinical Information Regarding Pertussis

- The clinical presentation of pertussis is dependent on many factors, including age and previous infection or immunization.
- Pertussis may not always have the characteristic "whoop" in infants and adults, leading physicians to think about other disease processes such as acute and chronic bronchitis, asthma, infection with *Mycoplasma pneumoniae* or *Chlamydia pneumoniae*, and common viral upper respiratory infection.
- Infants may be the most difficult to diagnosis with pertussis because they may present initially with only one or more of the following: slight cough, flaccidity, hypoxia or apnea.
- Infants are at greatest risk for other severe complications of pertussis, including seizures, encephalopathy, refractory pulmonary hypertension and death.

Laboratory Testing

- The only laboratory test for pertussis recognized by the Center for Disease Control is culture from specimens (swab or aspirate) obtained from the posterior nasopharynx (not from the nares). DFA has many problems with specificity and sensitivity. Serologic tests (IgM or single IgG titer) have not been standardized and cannot be used to make a diagnosis of pertussis. While PCR is not standardized, it is an accepted means of diagnosis when performed by the DHEC Bureau of Laboratories.
- Physicians who would like information about these tests are encouraged to contact their local DHEC public health office or CDC at http://www.cdc.gov/nip/publications/pertussis/chapter2_amended.pdf

Treatment

- Appropriate treatment (shown below) should be instituted for any infant in whom the diagnosis of pertussis is considered, especially if there is a family member, caretaker or close contact with a history of cough. For more information, see http://www.cdc.gov/nip/publications/pertussis/chapter3a_update_macrolides.pdf
- Treatment early in the course of infection may prevent some of the serious complications associated with pertussis.
- Timely treatment should be provided for other symptomatic family members and close contacts.
- Although treatment given after the onset of paroxysmal cough will not ameliorate the symptoms, it may prevent the disease from being transmitted to other susceptible persons.

Prophylaxis

- Appropriate prophylaxis (shown below) should be provided for **<u>any</u>** close contact of a symptomatic person with pertussis.
- The purpose of prophylaxis is to prevent the close contact from developing infection and from transmitting it to other susceptible persons.

Recommendations for treatment and chemoprophylaxis for pertussis by age group[1]

Age group	Erythromycin[2] (14-day course)	Clarithromycin[3] (7-day course)	Azithromycin[4] (5-day course)
Adult	1-2 gm/day in 4 divided doses X 14 days	1000 mg/day in 2 divided doses X 7 days	500 mg/day in a single dose on day 1 followed by 250 mg daily in a single dose on days 2–5
>/= 6 months	40-50 mg/kg/day in 4 divided doses (maximum daily dose 2 gm) X 14 days	15 mg/kg/day in 2 divided doses (maximum daily dose 1000 mg) X 7 days	10 mg/kg/day in single dose on Day 1 (maximum daily dose 500 mg) then 5 mg/kg/day on Days 2 – 5 (maximum daily dose 250 mg)
1-5 months	40-50 mg/kg/day in 4 divided doses (maximum daily dose 2 gm) X 14 days	15 mg/kg/day in 2 divided doses (maximum daily dose 1000 mg) X 7 days	10 mg/kg/day in single daily dose X 5 days (maximum daily dose 500 mg)
< 1 month	Use as **alternate** drug because erythromycin has been associated with elevated risk of idiopathic hypertrophic pyloric stenosis. 40-50 mg/kg/day in 4 divided doses	**Not recommended**	**Preferred drug** 10 mg/kg/day in single daily dose X 5 days Note: Only limited safety data available

Footnotes to recommendations

[1]Alternative agent for the treatment and prophylaxis of pertussis

- TMP-SMZ may be used as an alternative agent in patients who are allergic to macrolides, who cannot tolerate macrolides, or who are infected, rarely, with a macrolide-resistant strain of *Bordetella pertussis.* The recommended dose in children is trimethoprim 8 mg/kg/day, sulfamethoxazole 40 mg/kg/day in two divided doses for 14 days. For adults, the recommended dose is trimethoprim 320 mg/day, sulfamethoxazole 1600 mg/day in two divided doses for 14 days. Because of the risk of kernicterus, TMP-SMZ should not be given to pregnant women, nursing mothers, premature neonates, or infants <2 months of age.

[2]Erythromycin contraindications and precautions

- Contraindicated in patients with known hypersensitivity to macrolides.
- Use with caution when co-administered with other agents that are metabolized by the hepatic cytochrome P-450 system including some agents used to treat convulsive disorders, antiretroviral drugs, and in patients taking astemizole or cisapride; synergistic drug interactions or elevated serum levels of these drugs leading to serious cardiac arrhythmias can result with concomitant erythromycin use (2).
- Drug interactions must be also considered when erythromycin is used concomitantly with theophylline, digoxin, oral anticoagulants, ergotamine or dihydroergotamine, lovastatin and other cholesterol-lowering drugs, and benzodiazipines; elevated and toxic levels of these drugs may result from drug interactions with erythromycin.
- The estolate ester of erythromycin is associated with an increased risk of drug-induced hepatitis in adults and should be avoided in pregnant women.

- Erythromycin is an FDA Pregnancy Category B. This means that animal reproduction studies have failed to demonstrate a risk to the fetus and there are no adequate and well-controlled studies in pregnant women.

[3]Clarithromycin contraindications and precautions

- Contraindicated in patients with known hypersensitivity to macrolides.
- Use with caution when co-administered with other agents that are metabolized by the hepatic cytochrome P-450 system including some agents used to treat convulsive disorders, antiretroviral drugs, and in patients taking astemizole or cisapride; synergistic drug interactions or elevated serum levels of these drugs leading to serious cardiac arrhythmias can result with concomitant clarithromycin use.
- Drug interactions must be considered when clarithromycin is used concomitantly with theophylline, digoxin, oral anticoagulants, ergotamine or dihydroergotamine, lovastatin and other cholesterol-lowering drugs, and benzodiazipines; elevated and toxic levels of these drugs can result from drug interactions when taken with clarithromycin.
- Clarithromycin is an FDA Pregnancy Category C. This means that animal reproduction studies have shown an adverse effect on the fetus and there are no adequate and well-controlled studies in humans, but potential benefits may warrant use of the drug.

[4]Azithromycin precautions

- Azithromycin is an FDA Pregnancy Category B. This means that animal reproduction studies have failed to demonstrate a risk to the fetus and there are no adequate and well-controlled studies in pregnant women.

Immunizations

- Immunization status should be checked on all children infected with or exposed to pertussis.
- Any child under 7 years of age missing immunizations should be brought up to date, even if they currently have pertussis.
- The FDA has approved two new vaccines appropriate for immunizing either adolescents and adults (11-64 years of age) or adolescents (10-18 years of age) only against pertussis. CDC guidance on the use of these vaccines is forthcoming.

Additional information

For additional information about pertussis can be found at the following CDC website:
http://www.cdc.gov/doc.do/id/0900f3ec80228696

DHEC Contact Information for Reportable Diseases and Reporting Requirements

All cases or probable cases of pertussis are urgently reportable by phone within 24 hours of identification to the local county/regional health department. The local health department will provide assistance in the identification of close contacts and the proper laboratory diagnosis, treatment and prophylaxis of pertussis and will report these cases to the State Health Department (DHEC).

Reporting of cases or probable cases of pertussis is consistent with South Carolina Law requiring the reporting of diseases and conditions to your state or local public health department. (State

Law # 44-29-10 and Regulation # 61-20) as per the DHEC 2004 List of Reportable Conditions available at: http://www.scdhec.gov/health/disease/docs/reportable_conditions.pdf.

Information on school and childcare exclusion criteria for children with infectious diseases including pertussis is available at http://www.scdhec.gov/health/disease/exclusion.htm.

Federal HIPAA legislation allows disclosure of protected health information, without consent of the individual, to public health authorities to collect and receive such information for the purpose of preventing or controlling disease. (HIPAA 45 CFR §164.512).

Public Health Offices

Mail or call reports to the Epidemiology/Disease Report Office in the appropriate county listed below.

Region 1
(Anderson, Oconee)
220 McGee Road
Anderson, SC 29625
Phone: (864) 231-1966
Fax: (864) 260-5623
Nights / Weekends: 1-(866)-298-4442

(Abbeville, Edgefield, Greenwood, Laurens, McCormick, Saluda)
PO Box 3227
1736 S. Main Street
Greenwood, SC 29646
Phone: 1-888-218-5475
Fax: (864) 942-3690
Nights / Weekends: 1-800-420-1915

Region 2
(Cherokee, Spartanburg, Union)
PO Box 4217
151 E. Wood Street
Spartanburg, SC 29305-4217
Phone: (864) 596-2227 ext. 210
Fax: (864) 596-3443
Nights / Weekends: (864) 809-3825

(Greenville, Pickens)
PO Box 2507
200 University Ridge
Greenville, SC 29602-2507
Phone: (864) 282-4139
Fax: (864) 282-4373
Nights / Weekends: (864) 460-5355 or
1-800-993-1186

Region 3
(Chester, Lancaster, York)
PO Box 817
1833 Pageland Highway
Lancaster, SC 29721
Phone: (803) 286-9948
Fax: (803) 286-5418
Nights / Weekends: 1-(866)-867-3886 or
1-(888)-739-0748

(Fairfield, Lexington, Newberry, Richland)
2000 Hampton Street
Columbia, SC 29204
Phone: (803) 576-2749
Fax: (803) 576-2993
Nights / Weekends: (803) 304-4252

Region 4
(Clarendon, Kershaw, Lee, Sumter)
PO Box 1628
105 North Magnolia Street
Sumter, SC 29150
Phone: (803) 773-5511
Fax: (803) 773-6366
Nights / Weekends: 1-(877)-831-4647

(Chesterfield, Darlington, Dillon, Florence, Marlboro, Marion)
145 E. Cheves Street
Florence, SC 29506
Phone: (843) 661-4830
Fax: (843) 661-4859
Nights / Weekends: (843) 660-8145

Region 5
(Aiken, Allendale, Barnwell)
1680 Richland Avenue, W. Suite 40
Aiken, SC 29801
Phone: (803) 642-1618
Fax: (803) 643-8386
Nights / Weekends: (803) 827-8668 or
1-800-614-1519

Region 5 (cont.)
(Bamberg, Calhoun, Orangeburg)
PO Box 1126
1550 Carolina Avenue
Orangeburg, SC 29116
Phone: (803) 533-7199
Fax: (803) 536-9118
Nights / Weekends: (803) 954-8513

Region 6
(Georgetown, Horry, Williamsburg)
2830 Oak Street
Conway, SC 29526-4560
Phone: (843) 365-3126
Fax: (843) 365-3153
Nights / Weekends: (843) 381-6710

Region 7
(Berkeley, Charleston, Dorchester)
4050 Bridge View Drive, Suite 600
N. Charleston, SC 29405
Phone: 843-746-3806
Fax: (843) 746-3851
Nights / Weekends: (843) 219-8470

Region 8
(Beaufort, Colleton, Hampton, Jasper)
1235 Lady's Street
Port Royal, SC 29935
Phone: (843) 525-7603
Fax: (843) 525-7621
Nights / Weekends: 1-800-614-4698

Bureau of Disease Control
Acute Disease Epidemiology Division
1751 Calhoun Street
Box 101106
Columbia, SC
Phone: (803) 898-0861
Fax: (803) 898-0897
Nights / Weekends: 1-888-847-0902

Categories of Health Alert messages:

Health Alert: conveys the highest level of importance; warrants immediate action or attention.
Health Advisory: provides important information for a specific incident or situation; may not require immediate action.
Health Update: provides updated information regarding an incident or situation; unlikely to require immediate action.